

REMARKS

On page 2 of the Office Action, the Examiner rejects Claims 28-29 under 35 U.S.C. § 112, first paragraph.

Applicants will shortly file an appropriate Statement of Availability, to thereby render moot this rejection.

On page 4 of the Office Action, the Examiner rejects Claims 11-14 and 25-35 under 35 U.S.C. § 103 as being unpatentable over Bothe et al taken with Norferm, DA and Larsen & Joergensen, and further in view of Atlas & Parks and Patz et al.

Specifically, it is the Examiner's position that the expression "sterilized" in Claim 11 is a product-by-process limitation, and the patentability of the product does not depend upon its method of production.

In view of the amendments to Claim 11, the claims do not contain process limitations, but rather "structural" limitations.

In any event, the Examiner notes that Bothe et al, taken with Norferm, DA and Larsen & Joergensen, do not teach a sterile nutrient which is a carbon source, such as glucose. However, it is the Examiner's position that Atlas & Parks teaches the use of glucose as a sterile nutrient. Further, the Examiner states that Patz et al teaches a microorganism growth substrate comprising a sterile nutrient composition (i.e., a chemical thermal hydrolyzate) obtained from a biomass of a culture of bacteria including methanotropic bacteria, further, comprising at least one sterile nutrient, as a carbon source (such as

methanol). Hence, the Examiner concludes that it would have been obvious to modify the microorganism growth substrate of Bothe et al, to add a sterile nutrient as a carbon source, such as glucose, in view of Atlas & Parks and further, given the disclosure in Patz et al, it would have been obvious to use to bacterial biomass for cultivation of bacteria to achieve the present invention.

For the following additional reasons, Applicants respectfully traverse the Examiner's rejections.

Initially, Applicants respectfully submit that the Examiner's rejection is one based on hindsight, which is an impermissible basis for issuing a rejection. Applicants respectfully submit that it cannot be considered obvious to include the various components taught by Atlas & Parks or by Patz et al absent realization that the microorganism composition itself described in the primary reference may be suitable for use as a growth substrate (or at least as a component of such a substrate). It is this realization which is at the heart of Applicants' invention.

As will be clear from the following comments, the primary references merely relate to a process for the preparation of a biomass material. It is this biomass material which, in accordance with Applicants' invention, is then used as a component of a growth substrate for use in cultivating other microorganisms. This growth substrate also contains a suitable carbon source which is essential for microorganism growth. None of the primary references in any way teach or suggest the use of the biomass material for this purpose. Furthermore, the nature

of the nutrients which might be used in the preparation of the basic biomass material itself is irrelevant in the context of its end use.

Applicants' invention relates to a microorganism growth substrate in which the nitrogen source is provided by a bacterial biomass product derived from a culture comprising a combination of methanotrophic and heterotrophic bacteria. In addition to this, the growth substrate comprises a suitable carbon source (which is sterile) and, optionally, a diluent. The claims to the growth substrate further require that the bacterial biomass is "sterile", i.e., the enzymes are inactivated to inhibit further enzymatic activity. "Sterility" of the various components of the growth substrate is an important aspect of the product claims, the significance of which the Examiner continues to overlook. In the absence of any hint in any of the prior art that the Norferm product may be suitable for the production of a growth substrate, neither the "sterilization", nor indeed the combination with a sterile carbon source, can be considered an obvious modification. Only with hindsight knowledge of the invention might it then be obvious to "sterilize", the product and combine such with a sterile carbon source.

Bothe et al describes the growth of *Methylococcus capsulatus* (Bath) in a production process involving the use of natural gas as the carbon source. Bothe et al describes the presence of a bacterial consortium comprising various heterotrophic bacteria which are necessary to support the continuous cultivation of the methanotroph. The focus of

Bothe et al is in the isolation and characterisation of the heterotrophs. The only reference to the use of the product is as a protein source in feedstuff (see under Introduction on page 33). Indeed, this is the very same use which is described in the Norferm product brochure.

Larsen et al describes a method involving heat-shock for reducing the nucleic acid content of *Methylococcus capsulatus* (Bath) in order to render such suitable for human consumption. *Methylococcus capsulatus* (Bath) is grown in an ammonium/mineral salts medium (AMS) using methane as the carbon source. There is no mention of the presence of any heterotrophs during cultivation, nor is there any hint or suggestion that the final product may be combined with a sterile carbon source in order to provide a growth medium for other microorganisms.

The disclosure of the primary references relied on by the Examiner is thus limited to the production of the methanotrophic bacterium *Methylococcus capsulatus* (Bath) and its use in feedstuff or for human consumption. None of these references in any way suggest that the resulting biomass itself may serve as the nitrogen source in a growth medium for the cultivation of other microorganisms, as claimed. In the absence of this knowledge, it could not have been considered obvious to provide a sterile product or to combine such with a sterile carbon source as required by the present claims.

In an attempt to find the missing features of the claims, the Examiner relies on Atlas & Parks which discloses various nutrient media used for the cultivation of bacteria. The Examiner's selection of nutrient media from this document is

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based on "Methanobacteria Medium" and those media used for cultivation of heterotrophs (specifically *lactobacillus* species). Whilst they might mention glucose as a component of nutrient media for the cultivation of methanotrophs or heterotrophs, this is not sufficient to render obvious the invention as claimed. The Examiner seems to suggest it would have been obvious in light of Atlas & Parks to modify the teaching of Bothe et al to include glucose as a carbon source. However, even if those skilled in the art were motivated to replace the carbon source (i.e., methane or natural gas) described in any of the primary references with glucose, this would merely result in an alternative medium for the cultivation of *Methylococcus capsulatus* (Bath). Thus, the Examiner's suggested combination of these references would not yield a product falling within the scope of the claims. In addition, Atlas & Parks does not in any way suggest that the *Methylococcus capsulatus* (Bath) bacterium itself may find use as a microorganism growth medium.

The Examiner also seeks to rely on Patz et al to suggest that the biomass generated from methanotrophic bacteria would be suitable for use as a nutrient source for the growth of microorganisms. However, this reference contains no teaching with respect to a combination of methanotrophic and heterotrophic bacteria as recited in Applicants' claims. Applicants' finding that a combination of such bacteria may be used as a "broad spectrum" growth medium which may be suitable for use with unknown microorganisms is in no way obvious from Patz et al.

Absent any hint in any of the cited prior art that Applicants' product may find use as a growth substrate, it is also clear that the claimed features are not obvious over the cited prior art, i.e., without realizing that the product may be used in this way, it would not have been obvious that such should be sterile, much less combined with other sterile nutrients. Hence, the Examiner's obviousness rejection is based on impermissible hindsight.

Accordingly, Applicants respectfully submit that the present invention is not taught or suggested by Bothe et al alone, or in view of Norferm, DA, Larsen & Joergensen, Atlas & Parks and Patz et al, and thus request withdrawal of the Examiner's rejection.

Applicants hereby add method Claim 36, i.e., a method of culturing a microorganism comprising culturing a microorganism in the presence of the growth substrate of *inter alia*, Claim 11, and request rejoinder of the method claim.

On page 9 of the Office Action, the Examiner provisionally rejects Claims 11-14 and 25-35 under the doctrine of obviousness-type double patenting as being unpatentable over Claims 30 and 32-34 of pending Application No. 10/504,464. Further, the Examiner provisionally rejects Claims 11-14 and 25-35 under the doctrine of obviousness-type double patenting as being unpatentable over Claims 8 and 13-27 of co-pending Application Serial No. 10/504,463.

Since these rejections are provisional in nature, no action needs to be taken at this time.

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In view of the amendments to the claims, and the arguments set forth above, reexamination, reconsideration and allowance are respectfully requested.

The Examiner is invited to contact the undersigned at his Washington telephone number on any questions which might arise.

Respectfully submitted,



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